type locality—wooded calcareous bluffs of Elkhorn Creek, Franklin County, Kentucky, in the Bluegrass region of that state.—UNIVERSITY OF CINCINNATI.

A CTYOTAXONOMIC STUDY OF THE GENUS HYMENOPAPPUS (COMPOS.TAE)

BILLIE L. TURNER

(*Continued from page 269*)

9a. **Hymenopappus scabiosaeus** L'Hér. var. **scabiosaeus**

Hymenopappus scabiosaeus L'Hér. Hymenop. **1:** 1788.
Rothia caroliniensis Lam. Jour. Hist. Nat. **1:** 17. 1792. *Hymenopappus caroliniensis* Porter, Mem. Torr. Bot. Club **5:** 338. 1894. Photograph of type examined (GH): without date, sheet from Lamarck's herbarium.

Hymenopappus laxiflorus L'Hér. in DC. Prodr. **5:** 658. 1836, as synonym.

Plants biennial, 40–150 cm. tall, the stems single from each tap-root, erect, much-branched, angled and grooved, glabrous to sparsely pubescent; leaves alternate, mostly glabrous above and variously pubescent beneath, in the first year simple or mostly once-pinnate, up to 25 cm. long, 4–5 cm. wide, forming a basal rosette; later formed stem-leaves mostly glabrous, 15–50 in number, not much reduced, once-pinnate to bipinnately dissected, with broad to narrowly linear segments; heads numerous, discoid, 25–80-flowered, on densely strigose or glabrate ultimate peduncles mostly 1 to 5 cm. long, these having at their bases conspicuous, membranous, petaloid bracts 5–14 mm. long, 3–10 mm. wide (rarely much reduced); involucral bracts white, petaloid, showy, equal or subequal, 7–15 mm. long, 4–8 mm. wide, membranous for half or more of their length; corollas white or creamy white, sweet scented, 3–5.5 mm. long, the tube stipitate-glandular, 2–3 mm. long, the throat funnelform, 1.2–3 mm. long, with lobes reflexed, about equaling the lobes; achenes obpyramidal, 4-sided, 3.5–5 mm. long, short-pubescent, principally on the corners, with hairs 0.1–0.4 mm. long, the faces with 2–3 nerves; pappus of 14–18 small obovate scales 0.1–0.6 mm. long; anthers completely exserted, 2–2.5 mm. long; chromosome number not known.

DISTRIBUTION.—Scattered, apparently rare, principally in the Mississippi Valley region and southeastern United States: known by relatively few collections from Indiana, Illinois, Missouri, Oklahoma, Arkansas, and eastern Mississippi, Georgia, adjacent South Carolina, and Florida. In the southern part of its range it is commonly found in sandy pine woods; in the northern part it occupies rocky, sandy barrens and open disturbed areas (Fig. 45). April–June.

Hymenopappus scabiosaeus var. *scabiosaeus* is difficult to characterize because of the inadequacy of herbarium material from the states outside of Florida. Taken throughout its range the variety demonstrates considerable variability. In eastern Oklahoma and western Arkansas the taxon has races with more pinnately dissected, glabrate leaves than are typical for the variety in South Carolina and Florida. Likewise, the races in Illinois and Indiana tend to be distinguished by extremely large, ovate peduncular bracts. To apply formal nomenclature to these races would be unjustified on present-day evidence, since these same characters may reoccur (with much less frequency) in material from the Southeastern States. In addition, this regional variability is complicated by the seemingly complete intergradation of var. *scabiosaeus* with var. *corymbosus* at their area of contact in eastern Oklahoma and Kansas. Typical *Hymenopappus scabiosaeus* var. *scabiosaeus* can be distinguished from var. *corymbosus* by the key characters listed. In this region, however, clearly intermediate specimens are found. This rather complete intergradation between the two taxa, combined with their close, overall resemblance has been the principal reason for the reduction of *H. corymbosus* to varietal rank.

Early in the course of this study the author was inclined to treat *Hymenopappus scabiosaeus* in a broad sense, including within this species all the funnelform-throated, biennial taxa of the genus. Such a treatment, although perhaps justifiable on purely morphological grounds, would ignore the physiological, genetical, and ecological isolation of some included members. When such isolational barriers can be demonstrated or inferred, even when the morphological characters are somewhat intermediate between the specific and infraspecific level (as in *H. artemisiaefolius*), these other factors should be considered in drawing taxonomic lines. For this reason *H. scabiosaeus* and *H. artemisiaefolius* have been treated as two specific taxa instead of included together under one.

Representative Specimens.—**Arkansas.** benton co.: Along R.R., Sulphur Springs, *E. J. Palmer 2938* (mo). carroll co.: Beaver, *E. J. Palmer 5586* (mo, pom, us). **Florida.** alachua co.: 10 mi. W. of Gainesville, *Blanton 6398* (pom). jackson co.: near Marianna, *Curtiss 6806* (gh, mo, ny, uc). leon co.: near Tallahassee, Apr. 1843, *Rugel* (mo,

NY). MARION CO.: E. of Flemington, *Moldenke 1084* (MO, NY, US). MARTIN CO.: dry place, May 2, 1941, *P. O. Schallert* (NY, UC). SUWANEE CO.: (w/o locality), June–July, 1898, *A. S. Hitchcock* (MO). WAKULLA CO.: Sopchoppy, *F. H. Sargent 6095* (SMU). **Georgia.** JENKINS CO.: dry sandy soil near Millen, *R. M. Harper 762* (GH, MO, NY, US). **Illinois.** CASS CO.: Beardstown, July, 1842, *C. A. Geyer* (GH, MO). KANKAKEE CO.: along R. R., St. Anne, *G. N. Jones 17280* (MO). MASON CO.: sandy barrens and prairie, June 18, 1845, *S. B. Mead* (GH, NY). **Indiana.** STARKE CO.: "frequent in three dry sandy fallow fields," 3 mi. N. and 1.5 mi. E. of North Judson, *Deam 49006* (GH). **Mississippi.** LOWDENS CO.: Columbus, *S. M. Tracey 1400* (GH, MO, US). **Missouri.** BARRY CO.: Eagle Rock, *B. F. Bush 104* (GH, MO, US). MISSISSIPPI CO.: cemetery 2 mi. W. of Charleston, *Steyermark 10259* (MO). SCOTT CO.: sandy open places, May 20, 1895 (1894), *H. Eggert* (GH, MO). STONE CO.: Baxter, *Bush 15587* (MO). **Oklahoma.** CHEROKEE CO.: 20 mi. N. E. of Tahlequah, *N. T. Knodos 71* (SMU). LE FLORE CO.: Pine Valley, *Goodman 2537* (GH, MO, NY, POM, RM). MAYES CO.: 2 mi. N. of Locust Grove, *Stratton 3718* (CAS). MCCURTAIN CO.: Bethel, dry pine hills, *Demaree 12691* (MO, NY). **South Carolina.** AIKEN CO.: Aiken, May 1869, *W. M. Canby* (DS, GH, MO, NY, US).

9b. **Hymenopappus scabiosaeus** var. **corymbosus** (T. & G.), comb. nov.

Hymenopappus corymbosus T. &. G. Fl. N. Amer. **2:** 372. 1842. *Rothia corymbosa* O. Ktze. Rev. Gen. **1:** 361. 1891. Type examined (NY): "Arkans., Leavenworth." Probably collected in what is now present-day Oklahoma. (For an outline of Leavenworth's activities in this region, see McVaugh, 1947.)

Hymenopappus engelmannianus Kunth, Ind. Sem. Hort. Berol. 15. 1848. Ann. Sci. Nat., Series 3, **11:** 229, 1849. The plant from which this description was taken was grown from seed that had been collected in Texas and sent to Kunth by Engelmann. In the United States National Herbarium there is a sheet of a Lindheimer collection (Fasc. III. Texas. Comal Co.: New Braunfels along Guadalupe R., April. May, 1846, *Lindheimer 438*) which has the name *H. Engelmannianus* written in by hand on the original label. It is likely that this specimen represents a collection of the plant from which the seed was taken, Lindheimer being an "intimate friend" and botanical correspondent of Engelmann (Geiser, 1948, p. 137). The original description is undoubtedly that of *H. scabiosaeus* var. *corymbosus*.

Hymenopappus sulphureus Rydb. in Britton, Man. 1007. 1901. Type examined (NY): Kansas. Riley Co.: "Stoney hills," May 23, 1895 *J. B. Norton 285*.

Plants biennial, 40–100 cm. high, the stems single from each tap-root (rarely two crowns forming, especially on injured plants), erect, usually much branched, angled and grooved, tomentose to nearly glabrate; leaves alternate, forming the first year a basal rosette, the primary leaves entire to variously lobed, the later formed rosette leaves becoming pin-

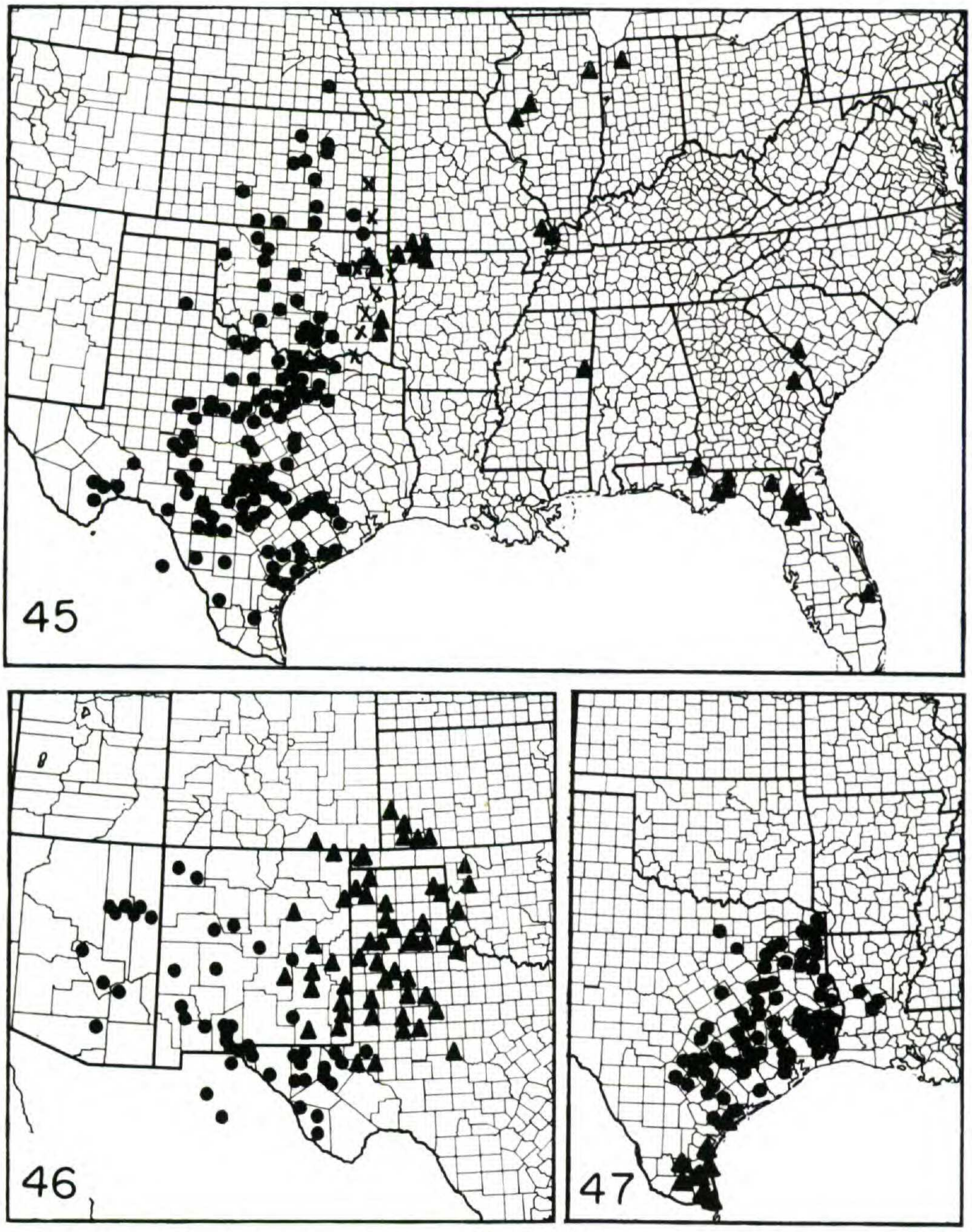

Fig. 45–47. Distribution of *Hymenopappus* species. Fig. 45. *Hymenopappus scabiosaeus* var. *scabiosaeus* (triangles); *H. s. corymbosus* (disks); intermediate specimens (×). Fig. 46. *H. flavescens* var. *flavescens* (triangles); *H. f. cano-tomentosus* (disks). Fig. 47. *H. artemisiaefolius* var. *artemisiaefolius* (disks); *H. a. riograndensis* (triangles).

nately dissected, 5–15 cm. long, 5–7 cm. wide, mostly glabrate or sparsely canescent above, more tomentose below, the ultimate divisions linear, acute, 2–8 mm. wide; stem leaves (on well developed plants) 15–30, becoming reduced upward; heads campanulate, numerous (40–100), discoid, 20–60-flowered, on densely strigose ultimate peduncles 0.5–3

cm. long, these without conspicuous petaloid bracts at their bases, involucre campanulate, principal bracts 5–9 mm. long, 2–4 mm. wide, glabrate above, pubescent below, yellowish-white or white membranous for 2–4 mm. from the acute to narrowly obtuse tip; corollas white or creamy white, 3–4 mm. long, sweet scented, the tube sparsely glandular, 2–3 mm. long, the throat funnelform 1–1.5 mm. long, with lobes reflexed, the lobes equal to or nearly as long as the throat; achenes obpyramidal, 4-sided, 3–4 mm. long, short-pubescent (especially on the corners) with hairs 0.1–0.5 mm. long, the achene faces 2–3-nerved; pappus of 14–18 obtuse or spatulate scales, 0.2–0.8(–1) mm. long; anthers completely exserted, 1.6–2.5 mm. long; $n = 17$.

DISTRIBUTION.—Open prairies in heavy, calcareous soils and on limestone outcrops from southern Nebraska, central Kansas, Oklahoma to southern Texas and adjacent Mexico (Fig. 45). Late March–July.

The variety is well marked throughout the greater portion of its range, but where it comes in contact with the closely related var. *scabiosaeus* in eastern Oklahoma and Kansas there is complete intergradation between the two taxa (intermediate specimens are designated by x on the distribution map). Typical var. *corymbosus* may be distinguished from var. *scabiosaeus* by its short, narrow involucral bracts, and by its ebracteate peduncles. Typical var. *scabiosaeus* has long, broad involucral bracts, and conspicuous white, membranous peduncular bracts. Likewise, in western Texas, where var. *corymbosus* comes in contact with the yellow-flowered *H. flavescens* var. *flavescens* there appears to be considerable intergradation of their characters, especially as regards leaf- and corolla-shape, perhaps indicating considerable hybridization and introgression in the past between these species. (For implications of such hybridization see discussion under *H. flavescens* var. *flavescens*.) Evidence of present-day hybridization between these two taxa has been found only in a few specimens from Tom Green Co., Texas (*Havard 22*), where their ranges overlap. *H. scabiosaeus* var. *corymbosus* and *H. flavescens* var. *flavescens* are kept genetically separate, for the most part, at their regions of overlap, by distinct seasonal differences in principal flowering times, the former reaching its peak 3–4 weeks before the latter (Fig. 44).

In Texas, the distribution of *H. scabiosaeus* var. *corymbosus* is especially interesting. It is found almost exclusively on heavy clay prairies, its range stopping abruptly at the margins of the

sandy soils of pine and post oak woods.[12] *H. artemisiaefolius* var *artemisiaefolius* occupies these latter habitats. In spite of their extensive region of apparent contact, there is little evidence of intergradation, hybridization or introgression between the two taxa, there presumably being almost complete ecological isolation (possible exceptions discussed below). Lindheimer, an early botanical explorer in Texas, was probably the first to note the ecological distinction between these species, noting in 1846 on a field label of one of his collections the following (*Lindheimer 438:* GH):

Hymenopappus corymbosus

In patches on Prairies and margin of wood in fertile rather heavy soil (*H. artemisiaefolius* in sandy soil)
$\frac{4.5}{4.6}$ F. L. n. Br.

In the Rio Grande Valley of Texas *H. scabiosaeus* var. *corymbosus* becomes quite variable as regards several characters, possibly the result of contamination from *H. artemisiaefolius* var. *artemisiaefolius* or its var. *riograndensis.* This area of Texas may prove to hold the answer to some of the evolutionary problems of the *H. artemisiaefolius—H. scabiosaeus* complex. The lack of herbarium material from this region has made the task of evaluating variability of the represented taxa impossible, but it seems clear that the area occupies a critical position as concerns the origin, migration, and subsequent evolution of the funnelform-throated *Hymenopappi.*

A peculiar group of specimens from the Gulf Coastal Prairies in Matagorda and Ft. Bend counties, Texas (*Fisher s.n.; Palmer 9668; Fisher 40093*), perhaps points to the existence of yet another closely related variety within the *H. scabiosaeus* complex. These specimens are like var. *corymbosus* except for their dwarfish, scapose habit (scarcely exceeding 30 cm. in height). However, in light of our present knowledge, it seems best to consider these specimens as representatives of a rather distinct race of

[12] One must be familiar with the peculiar long-distance interfingering of prairie with pine and oak woodland in south-central Texas to appreciate fully this ecological isolation. Dots, which seem on the map to be included in the range of *H. artemisiaefolius* var. *artemisiaefolius*, are, in actuality, on well defined prairie strips within this region.

the variety, at least until further field and variability studies are made on the populations represented in this area.

REPRESENTATIVE SPECIMENS.—**Kansas.** ANDERSON CO.: 1.5 mi. N. of Welda, *R. L. McGregor 4277* (GH)*[13] BARBER CO.: 6 mi. W. of Hardtner, *Rydberg & Imler 626* (NY). BUTLER CO.: August, *S. F. Poole 1302* (US). CLOUD CO.: Miltonvale, *Benke 5181* (GH). COWLEY CO.: (w/o locality), May, 1898, *M. White* (MO). DICKINSON CO.: Solomon, *Benke 4313* (US). EDWARDS CO.: prairies, *A. Finch 136* (MO). GEARY CO.: Ft. Riley, *E. E. Gayle 469* (NY). HARPER CO.: 2 mi. W. of Athony, *Rydberg & Imler 611* (NY). LABETTE CO.: Oswego, bluffs 4 mi. W. of town, *Rydberg & Imler 326* (MO, NY).* MARION CO.: Florence, June 18, 1885, *Pringle* (GH). RILEY CO.: Stony hills, *J. B. Norton 285* (GH, MO, NY, RM, US). SALINE CO.: 6 mi. N. of Salina, *Hancin 2162* (NY). WILSON CO.: 6 mi. S. W. of Neodesha, *W. H. Horr E526* (RM, SMU, US, WS). **Nebraska.** LANCASTER CO.: Lincoln, Aug. 26, 1896, *G. G. Hedgcock* (MO). **Oklahoma.** ADAIR CO.: Westville, May 19, 1921, *Ensign* (NY).* ATOKA CO.: 8 mi. S. of Atoka, *M. Hopkins & A. & R. Nelson 1073* (MO, RM). BLAINE CO.: near Longdale, *G. W. Stevens 831* (GH). CADDO CO.: 3 mi. E. of Hydro, *Hubricht, Shoop, & Heinze B1387* (MO). CARTER CO.: S. of Turner Falls, *Demaree 12298* (MO, NY, UC, US). CLEVELAND CO.: Norman, *W. H. Emig 493* (MO, US). COMANCHE CO.: Fort Sill, *J. Clemens 11843* (CAS, GH, MO, RM). ELLIS CO.: near Shattuck, *Clifton 3452* (GH, MO, NY). GRADY CO.: on False Washita between Fort Cobb and Fort Arbuckle, 1868, *E. Palmer 447* (NY, US). JOHNSTON CO.: Tishomingo, *Cory 58892* (SMU). LATIMER CO.: Limestone Gap, June, 1875, *G. D. Butler* (GH, MO).* LOGAN CO.: Guthrie, *G. W. Stevens 3224* (GH). MAJOR CO.: near Cleo, *G. W. Stevens 786* (DS, GH, MO). MURRAY CO.: Platt Nat'l. Park, *Demaree 12230* (MO, NY, UC). PONTOTOC CO.: S. of Ada, near city limits, *G. T. Robbins 2483* (SMU, UC). PUSHMATAHA CO.: near Finley, *E. J. Palmer 39397* (GH).* ROGERS CO.: Catoosa, *B. F. Bush 1140* (MO, NY).* TULSA CO.: R. R. near Tulsa, May 10, 1940, *H. A. Hawk* (MO). WOODS CO.: near Alva, May 22, 1913 (*G. S. Stevens 547* (DS, MO, NY, US). **Texas.** ARKANSAS CO.: W. of Tivoli on coastal prairie, *Whitehouse 12075* (SMU). BEE CO.: Beeville, *M. E. Jones 29436* (POM). BELL CO.: near Temple, *S. E. Wolff 503* (US). BEXAR CO.: 4 mi. N. W. of San Antonio, *M. Clara 650* (CAS, POM, UC). BLANCO CO.: between Johnson City and Marble Falls, *C. L. & A. A. Lundell 14544* (SMU, US). BREWSTER CO.: 38 mi. S. of Marathon, *Ferris & Duncan 2832* (CAS, DS). BROOKS CO.: roadside, *Clover 823* (NY). BURNET CO.: 10 mi. S. E. of Marble Falls, Rd. to Bee Caves, *L. H. Shinners 7239* (SMU). CALLAHAN CO.: Clyde, *E. J. Palmer 13683* (MO). COLLINS CO.: 2 mi. S. of McKinney, *Timmons 436* (NY). COMAL CO.: New Braunfels, *Lindheimer 929* (GH, MO, NY, SMU, UC, US). COOKE CO.: 7 mi. N. of Gainesville, *Cory 56131* (SMU). DALLAS CO.: rocky prairies near Dallas, *Reverchon 1508* (GH, MO, NY, US). DENTON CO.:

[13] Specimens intermediate toward var. *scabiosaeus* are indicated by an asterisk (*); these are shown on the distribution map (Fig. 45) with an "x."

2.5 mi. S. of Sanger, *Cory 53240* (SMU). EDWARDS CO.: Ranch Expt. Station, *Cory 19029* (GH). ERATH CO.: 8 mi. N. E. of Stephenville, *F. W. Gould 5666* (SMU). FANNIN CO.: Bonham, May, 1896, *J. M. Milligan* (US). FORT BEND CO.: Richmond, *G. L. Fisher 40093* (CAS, US). GILLESPIE CO.: 1 mi. E. of Willow City, *Cory 53625* (SMU). GOLIAD CO.: prairies N. of Goliad, Apr. 8–9, 1900, *H. Eggert* (MO). GRAYSON CO.: 1.7 mi. N. of Collinsville, *Shinners 12402* (SMU). KARNES CO.: 6 mi. N. of Tulsita, *J. F. Hennen 605* (SMU). KAUFMAN CO.: 2 mi. E. of Terrell, *Shinners 10101* (SMU). KERR CO.: Kerrville, *A. A. Heller 1638* (GH, MO, NY, UC, US, WS). LAMAR CO.: Arthur City, along Red R., R. R. embankment, *Cory 56076* (SMU, US).* LASALLE CO.: sands, Cotulla, Apr. 29, 1905, *J. Reverchon* (SMU). LLANO CO.: near Llano, *S. E. Wolff 1586* (US). MCLENNAN CO.: gravel pit, mouth of White Rock Cr., *L. D. Smith 392* (US). MATAGORDA CO.: Bay City, *E. J. Palmer 9668* (DS, MO, US). MEDINA CO.: 1 mi. W. of D'Hanis, *Shinners 7301* (SMU). MILLS CO.: 6.5 mi. S. of Goldthwaite, *Cory 13081* (GH). MITCHELL CO.: red-bed slopes above Lake Hollywood, *Pohl 4745* (SMU). MONTAGUE CO.: W. of Nocona, highway 82, *Whitehouse 15050* (SMU). NOLAN CO.: Eagle Cr., Blackwell, *Studhalter 1198* (US). PALO PINTO CO.: vicinity of Mineral Wells, *Gillespie 5220* (DS, US). PARKER CO.: Weatherford, *Tracy 8544* (GH, MO, NY, US). PECOS CO.: 7 mi. N. of Iraan, cut-off from highway 290, near Sheffield, *Warnock & Turner 807* (SMU). REAL CO.: 29 mi. E. of Rocksprings, *Shinners 7338* (SMU). SAN PATRICIO CO.: near Mathis, *McKelvey 1711* (GH, POM). SOMERVELL CO.: 5 mi. W S. W. of Glen Rose, *Shinners 10072* (SMU). SUTTON CO.: Sonora Expt. Station, *Eggleston 16700* (NY). TARRANT CO.: Polytechnic, *Ruth 301* (MO, RM, US). TAYLOR CO.: 2 mi. W. of Buffalo Gap, *Tolstead 7036* (MO, UC). TERRELL CO.: 7 mi. E. of Longfellow, along highway 90, *Warnock & Turner 592* (SMU). THROCKMORTON CO.: 11 mi. N. of Throckmorton, *Cory 37257* (GH). TOM GREEN CO.: Knickerbocker Ranche, Dove Cr., *Tweedy 316* (US). TRAVIS CO.: Austin, *Tharp* (CAS, MO, SMU, UC). UVALDE CO.: W. of Uvalde, *M. E. Jones 28164* (DS, POM, UC). VAL VERDE CO.: N. of Del Rio, *M. E. Jones 28165* (DS, POM, UC). VICTORIA CO.: Victoria, *Tracy 9048* (GH, MO, NY, US). WALLER CO.: dry prairies, Hempstead, *E. Hall 357*, in part (GH, POM, US). WASHINGTON CO.: (w/o locality), April 21, 1939, *E. Brackett* (GH). WEBB CO.: E. of Laredo, *A. C. Martin 102* (US). WICHITA Co.: 1.6 mi. W. of Electra, *Whitehouse 9775* (US). WILBARGER CO.: 16.9 mi. W. of Electra, Waggoner pastures, *Whitehouse 9845* (SMU). WISE CO.: 2 mi. W. S. W. of Chico, *Shinners 1232* (SMU).

MEXICO. **Coahuila.** Municipio de Muzquiz, hacienda La Rosita, June 26, 1936, *Wynd & Mueller 294* (GH, MO, NY, US).

10a. **Hymenopappus artemisiaefolius** DC. var. **artemisiaefolius**

Hymenopappus artemisiaefolius DC. Prod. **5:** 658. 1836. *Rothia artemisiafolia* O. Ktze. Rev. Gen. **1:** 361. 1891. Photograph of type examined (US): "Texas, fl. sordide albi, 1832, *M. Berlandier 1532.*" Type in the Delessert Herbarium.

Plants biennial, 40–90 cm. high, tomentose to nearly glabrate; larger rosette leaves, 8–18 cm. long, simple to once-pinnate with broad primary divisions, 6–30 mm. wide, mostly densely tomentose on the lower surface, becoming glabrate above; stem leaves (6–)8–16, not much reduced upward; heads 30–60 per stem, campanulate, on ultimate peduncles 1–4(–6) cm. long; principal involucral bracts broadly elliptic to ovate, 6–12 mm. long, 3–7 mm. wide, snowy-white-membranous for about ½ their length or more (often tinged with red); corollas rosy-vinaceous to rarely completely white, 3.5–5 mm. long, the tube moderately glandular, 2.5–3 mm. long, the throat funnelform 1–1.5 mm. long, with lobes reflexed, as long as, or 1.5 times longer than the lobes; achenes obpyramidal, 4-sided, 3.5–4 mm. long, principally pubescent on the corners with short white hairs 0.3–0.6 mm. long, the faces 2–3-nerved; pappus of 16–18 oblong scales 0.5–1(–1.5) mm. long; anthers completely exserted, 2–2.5 mm. long; chromosome number $n = 17$.

Distribution.—Confined to the sandy pine and post-oak woods of eastern Texas and adjacent Louisiana (Fig. 47). March–May.

The closest relationship of this species is undoubtedly with the *Hymenopappus scabiosaeus* complex (probably var. *scabiosaeus*). It is not treated as a variety of that species because it is morphologically distinct throughout its range and apparently does not intergrade or hybridize with peripheral taxa (except possibly on a local scale with *H. scabiosaeus* var. *corymbosus* and to a limited degree with its own var. *riograndensis* in southern Texas). This treatment is justifiable on morphological, ecological, genetical, as well as practical grounds. Although the taxon is in apparent close contact with *H. scabiosaeus* var. *corymbosus* over at least 1000 miles (linearly along the peripheral area), along this entire line of contact the two taxa remain distinct, apparently as a result of edaphic isolation. *H. scabiosaeus* var. *corymbosus* occurs principally in heavy, clay soils while *H. artemisiaefolius*, as mentioned above, occurs principally in sandy soils. (For further information see discussion under *H. scabiosaeus* var. *corymbosus*.)

H. artemisiaefolius var. *artemisiaefolius* intergrades to a large extent with *H. a. riograndensis*, of southern Texas. This is reflected in the tendency toward a larger pappus, less membranous involucral tips, and fewer-leaved stems as one approaches this region from the north.

H. artemisiaefolius var. *riograndensis* could possibly represent the progenitor of this whole eastern complex (see discussion under that variety). Future field work should do much to

clarify the limits of the three related taxa of this area: *H. artemisiaefolius* var. *artemisiaefolius*, *H. artemisiaefolius* var. *riograndensis*, and *H. scabiosaeus* var. *corymbosus*.

Representative specimens.—**Louisiana.** natchitoches parish: Chopin, *E. J. Palmer 7328* (cas, mo, ny, us). rapides parish: Alexandria, Aug., 1840, *Hale* (ny). **Texas.** anderson co.: Palestine, Apr. 14, 1929, *Tharp* (ny). austin co.: Mills Cr., 16 mi. W. of San Felipe, Mar., 1844, *Lindheimer 107 (46)* (gh, mo, smu, uc, us). bastrop co.: Bastrop, Apr. 4, 1939, *Tharp* (ny, ws). bexar co.: San Antonio, *E. H. Wilkinson 110* (mo). bowie co.: pine woods N. of Texarkana, June 12, 1898, *Eggert* (mo, ny). brazos co.: College Station, Apr. 28, 1927, *H. B. Parks* (rsa). burleson co.: 7 mi. S. E. of Caldwell, *Gould & Celerier 5447* (smu, uc). caldwell co.: 6 mi. S. E. of Luling, *Cory 48875* (smu). cass co.: Bivins, May 12, 1941, *O. McGinnis* (cas, gh, mo, smu, uc). colorado co.: Columbus, June 11, 1910, *H. H. Rusby* (ny). comal co.: New Braunfels *Dapprich 6740* (smu). dallas co.: sands, Dallas, *J. Reverchon 527* (us). denton co.: 7 mi. N. E. of Roanoke, *Whitehouse 15979* (smu). dewitt co.: Cuero, *Bray 136* (us). fayette co.: Colony, (8 mi. N. of Flatonia), *E. W. Crawford 31* (us). freestone co.: 12 mi. S. of Fairfield, *Shinners 7108* (smu, ws). gonzales co.: Ottine, *Tharp 44472A* (rsa). guadalupe co.: swampy roadside between Luling and Seguin, *M. C. Metz 3066* (ny). hardin co.: Fletcher, *E. J. Palmer 9541* (ds, mo, us). harris co.: Houston, *Bush 35* (gh, mo, ny). harrison co.: Marshall, *E. J. Palmer 5318* (mo, pom, us). henderson co.: 14.6 mi. S. of Athens, *Hennen 274* (smu). houston co.: Grapeland, *Tharp 926* (gh, us). jasper co.: S. of Jasper, *C. L. & A. A. Lundell 11200* (smu). jefferson co.: Port Arthur (&) Beaumont, May 15, 1927, *I. Kolthoff* (us). leon co.: Normange, *Fisher 41269* (cas, us). mclennan co.: Waco, *L. Pace 96* (mo). marion co.: Jefferson, *B. B. Harris 459* (us). matagorda co.: Bay City, *E. J. Palmer 9629* (ds, mo, us). montgomery co.: 7 mi. S. of Conroe, *Shinners 7742* (smu). morris co.: Daingerfield St. Park, *D. S. & H. B. Correll 12440* (smu). newton co.: 4 mi. S. E. of Newton, *Shinners 7656* (rm, smu, uc). orange co.: Vidor, *M. B. Wood* (mo, uc). panola co.: 18 mi. N. W. of Carthage, *Shinners 7595* (gh, smu). polk co.: Livingston, *E. J. Palmer 5249* (mo, us). refugio co.: (w/o locality), *H. C. Benke 5439* (gh). robertson co.: 3.75 mi. S. E. of Hearne, *Cory 55732* (smu, us, ws). rusk co.: Henderson, Apr. 16, 1943, *M. Riedel* (mo), sabine co.: 15 mi. N. of Jasper, *Shinners 7637* (smu). san augustine co.: San Augustine, (w/o date), *G. L. Crocket* (us). shelby co.: 16 mi. S. E. of Center, *Shinners 7627* (smu). smith co.: Tyler St. Park, *Cory 63392* (gh, smu). travis co.: Austin, *Tharp 1378* (uc, us). tyler co.: 7 mi. S. of Woodville, *Whitehouse 23303* (smu). van zandt co.: 6.7 mi. E. of Grand Saline, *Van Vleet 1105* (smu). victoria co.: 10.5 mi.W. of Victoria, *Cory 55117* (smu, us). walker co.: (w/o locality), *R. A. Dixon 512* (cas, us). waller co.: Hempstead, *E. Hall 357* (gh, mo, ny). wash-

INGTON CO.: Brenham, Apr. 21, 1935, *V. Lehman* (NY). WILSON CO.: Sutherland Springs, *M. E. Jones 29436* (MO). WOOD CO.: Mineola, *Reverchon 2575* (MO, SMU).

10b. **Hymenopappus artemisiaefolius** var. **riograndensis** var. nov.

Herbae biennes, caulibus 2–8 foliatis, 45–100 cm. altis; foliis inferioribus integris 1-pinnatisve, 10–20 cm. longis, 2–5 cm. latis; pedunculis ebracteatis, 2–5 cm. longis; inflorescentiis magnis laxe cymoso-paniculatis, 20–60-capitulatis; involucris campanulatis, bracteis 5–7 mm. longis, 2–4 mm. latis, apice ad 1 mm. membranaceis; flosculis 3–3.5 mm. longis, tubo 2 mm. longo, lobis acutis ad 1.5 mm. longis; achaeniis villosis 4–5 mm. longis, capillis albidis 1–1.2 mm. longis; pappo conspicuo, squamellis lineari-oblongis, 1.5–2 mm. longis.

Plants biennial, 45–100 cm. high; principal rosette leaves 10–20 cm. long, 2–5 cm. wide, tomentose on both surfaces, simple to once-pinnate with broad, coarsely toothed divisions; stem leaves 2–8, much reduced upward; heads 20–60 per stem, campanulate, 40–60-flowered, on slender, bractless ultimate peduncles 2–5 cm. long; inflorescence a large, open cymose panicle, often comprising ⅔ of the plant height; principal involucral bracts 5–7 mm. long, 2–4 mm. wide, the apex narrowly obtuse or acute with an inconspicuous, yellow-membranous tip 1(2) mm. long or less; corollas "yellow-reddish," 3–3.5 mm. long, the tube sparsely glandular, 2 mm. long, the throat campanulate-funnelform, 1.5 mm. long with lobes reflexed, 1–1.2 times longer than the acute lobes; achenes 4–5 mm. long, pubescent principally on the corners with white hairs (0.8–)1–1.2 mm. long; pappus of 16–18 linear oblong scales, 1.5–2 mm. long; anthers exserted, 2–2.5 mm. long; chromosome number $n = 17$. Type: Texas. Brooks Co.: 2 mi. S. of Falfurrias, in deep sandy soil. March 20, 1952, *F. B. Jones 695* (SMU). Phototypes WS, TEX.

DISTRIBUTION.—Rio Grande Valley of Southern Texas in open gravelly or sandy-clay soils of the lower Gulf Coastal Plain. (Fig. 47).

This plant is a distinct variety which differs from *Hymenopappus artemisiaefolius* var. *artemisiaefolius* in a number of characters, including its more pubescent achenes, larger pappus, smaller corollas, fewer stem leaves, involucral bracts with inconspicuous membranous tips, and ebracteate peduncles. The latter two characters seem to link the variety to *H. scabiosaeus* var. *corymbosus*, but the total characters are those of *H. artemisiaefolius*. Further, the morphological characters listed above intergrade to a large extent with those of *H. artemisiaefolius* var. *artemisiaefolius* where the peripheral ranges of these two varieties approach each other. As yet, no similar intergradation has been found with H. *scabiosaeus* var. *corymbosus*. It is unlikely that the specimens cited represent hybrids or hybrid

swarms between this species and *H. artemisiaefolius* var. *artemisiaefolius*, since the variety has characters which are peculiar to itself, such as its long pappus and achenial hairs (remarkably similar to those of the *H. filifolius* complex).

Hymenopappus in the Rio Grande Valley of southern Texas is in critical need of field study both because of the scarcity of material from the area and because of the variability shown by the few specimens of the genus collected in this region. With the accumulation of more specific information, present concepts as to the relationship and status of var. *riograndensis* may have to be changed, but from the evidence available it seems best to consider it no more than a well marked variety of *H. artemisiaefolius*.

Representative specimens.—**Texas.** brooks co.: 2 mi. S. of Falfurrias, *F. B. Jones 695* (smu); near Fulfurrias, *Perkins & Hall 2857* (pom). cameron co.: Point Isabel, *R. Runyon 224* (us). kenedy co.: Norias Division of King Ranch, *M. C. Johnston 54595* (tex); kleberg co.: Santa Gertrudis Division of King Ranch, *M. C. Johnston 54483* (tex). hidalgo co.: 10 mi. N. of San Manuel, highway 281, *R. Runyon 2634* (us). refugio co.: 5.5 mi. S.E. of Austwell, *Cory 49078* (gh, smu). (This specimen approaches var. *artemisiaefolius*.) willacy co.: loose sand prairie a few mi. W. of Redfish Bay, *M. C. Johnston 54562* (tex).

EXCLUDED SPECIES

Hymenopappus anthemoides Juss. Ann. Mus. Par. **2:** 426. 1803. = Hymenoxys anthemoides (Juss.) Cass.

Hymenopappus douglasii Hook. Fl. Bor. Am. **1:** 316. 1834. = Chaenactis douglasii (Hook.) Hook. & Arn.

Hymenopappus glandulosus (S. Wats.) Rydb. N. Amer. Fl. **34:** 38. 1914. = Hymenothrix glandulosus S. Wats.

Hymenopappus glaucus Spreng. Syst Veget. **3:** 449. 1826. = Cephalophora glauca Cav.

Hymenopappus integrifolius (Nutt.) Spreng. Syst. Veget. **3:** 449. 1826. = Polypteris integrifolius Nutt.

Hymenopappus ligulaeflorus Nelson, Wyoming Expt. Sta. Bull. **28:** 135. 1896. = Hymenoxys richardsonii (Hook.) Cockerell.

Hymenopappus matricarioides Spreng. Syst. Veget. **3:** 450. 1826. = Ageratum matricarioides (Spreng.) Less.

Hymenopappus nelsoni (Greenman) Rydb. N. Amer. Fl. **34:** 49. 1914. = Hymenothrix glandulosa var. nelsonii Greenman.

Hymenopappus nevadensis Kellogg, Proc. Calif. Acad. **5:** 46. 1873. = Chaenactis nevadensis (Kellogg) Gray.

Hymenopappus palmeri (Gray) Hoffm. in Engler & Prantl. Nat. Pfl. **45:** 256. 1897. = Hymenothrix palmeri Gray.

Hymenopappus pedatus Cav. ex Lag. Gen. et. Sp. Nov. 28. 1816. = Florestina pedata (Cav.) Cass.

Hymenopappus wislizeni var. *setiformis* M. E. Jones, Contrib. West. Bot. **12:** 47. 1908. = HYMENOTHRIX WISLIZENII Gray

Hymenopappus wrightii (Gray) H. M. Hall, Univ. Calif. Publ. Bot. **3:** 179. 1907. = HYMENOTHRIX WRIGHTII Gray.

Hymenopappus wrightii var. *viscidulus* Jepson, Man. Fl. Pl. Calif. 1128. 1925. = HYMENOTHRIX WRIGHTII Gray.

In addition, the following species of *Rothia* Lam., *sensu* O. Kuntze (1898) are not *Hymenopappus: Rothia degenerica, Rothia intermedia, Rothia pinnata, Rothia pinnata pallida, Rothia pinnata purpurescens, Rothia pusilla.*

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Notes on Collinsia violacea.—The designation of *Collinsia violacea* Nutt. as a spring annual, in spite of its very early flowering habit, has seemed worthy of observation to the writer. Both *C. violacea* Nutt. and *C. verna* Nutt. are found in Illinois, and the former has been collected only in Shelby County in the central part of the state where it has been reported for 20 years. The latter species is a rather common early spring flowering plant in widely separated moist woodlands throughout Illinois.

Flowering records for *Collinsia violacea* in this state indicate that it is in bloom from late April through May. In his *Scrophulariaceae of Eastern Temperate North America*, Francis W. Pennell says, "Our species are spring-annuals of deciduous forests, dying when the trees have reached full foliage." (Page 290). In